ABSTRACT

An image of an object is reconstructed in a three-dimensional coordinate system in an x-ray computed tomography system. A partial scan of the object is performed by rotating an x-ray beam having a cone beam geometry around a portion of the object or rotating the object in the cone-beam. The x-ray beam forms on a scanning trajectory through a plurality of projection lines from a plurality of successive focal point locations. The scanning trajectory may be substantially circular, helical, spiral, or spiral-like. The x-ray beam, attenuated by the object during the spiral scan, is detected to produce detector values. The detector values are integrated along straight lines on the detector plane to obtain intermediate data. Three-dimensional Radon values representing approximate plane integrals of the object are calculated from the intermediate data using a Grangeat relationship or a modified or extended version or the Grangeat relationship. The calculated and estimated Radon values are then reconstructed into an image volume according to the Radon inversion formula.